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October 27, 1997

Ms. Barbara Okorn (3HW41)
BTAG Coordinator
EPA - Region III
841 Chestnut Street
Philadelphia, PA 19107

RE: Norfolk Naval Sewell's Point
a.k.a. Norfolk Naval Base

Dear Ms. Okorn:

Thank you for the opportunity to provide comments on the September 1997 Draft Ecological Risk Assessment of the NM Slag Pile (Site 2), Naval Base Norfolk, Norfolk, Virginia. The following comments are made on behalf of the National Oceanic and Atmospheric Administration (NOAA).

The ERA for Site 2 at the Norfolk Naval Base was a screening level risk assessment, and as such did not provide a detailed assessment of possible risks to terrestrial and aquatic receptors on or near the Site. A number of issues with the document resulted in questioning the validity of the results listed on page 8-1.

Very limited information was provided describing the Site, particularly the descriptions of the streams that were sampled for sediments and surface water. The maps that were provided did not clearly outline the locations of the streams sampled, nor was any information provided as to what water bodies the streams discharged, the distance to these discharge points, or the types of organisms using the streams. It is not known whether the streams provide habitat for NOAA trust species. A more thorough description of the water bodies on and near Site 2 needs to be provided, along with maps that clearly show the courses of these streams. This is particularly important for this stand along document.

There are a number of places (pages 1, 1-1,4-1, and 5-4) where the statement is made that "...a benchmark HQ greater than 1 is designated a COPC." Although the suggested change will not significantly alter the list of COPCs, this statement should read, "...a benchmark HQ equal to or greater than 1 is designated a COPC."

On page 2-11, section 2.2.2.4, the statement is made that "...concentrations are expected to become increasingly diluted...." This statement would be more forceful if the data from this study were cited as demonstrating this expectation, provided the data does support this position. There is a similar statement in section 2.2.2.5 on this same page. This comment also applies to this situation.

The assessment endpoints listed on under Section 3-1, page 3-1, of the document were very broad and non-specific. Considering the fact that this was a screening level risk assessment and relatively little data were available, the listed assessment endpoints seemed ambitious. As an example, the assessment endpoint for benthic invertebrates was listed as follows:

> Protection of benthic invertebrate communities from the toxic effects of contaminants in sediments and surface water to maintain species diversity, biomass, and nutrient cycling (trophic structure), to provide a food source for higher level consumers, and to ensure that contaminant levels in benthic invertebrate tissues are low enough to minimize the risk of bioaccumulation and/or other negative toxic effects in higher trophic levels.

Protection of species diversity and biomass (abundance) would have been sufficient. The remainder of the assessment endpoints listed for benthic invertebrates are not specific to the invertebrate community and do not assess benthic invertebrate community health, but address possible risks to higher trophic levels. These additional assessment endpoints should be discarded. A similar assessment endpoint was also listed for the fish community which addressed protection of higher trophic levels. As with the benthic invertebrates, this assessment endpoint should be changed.

The measurement endpoints listed under Section 3.3 on page 3-3 of the document are non-specific and vague. As an example, the measurement endpoint listed for fish communities was as follows:

> For the assessment endpoint that addresses the health of fish resources that utilize the site, the measurement endpoint considered that fish could be affected by contaminants through short-term toxicity to larvae and juveniles and long-term exposure to organisms ultimately affecting reproduction. For the purposes of this ecological risk assessment, the largemouth bass was selected as the measurement endpoint receptor species. It is highly unlikely that

largemouth bass would occur in this small stream at Site 2, however, the largemouth bass is used as a surrogate species to represent the aquatic predator in a freshwater stream at NBN. Levels of contamination exposure to bass were compared to levels documented to cause adverse effects in fish.

The measurement endpoint may be implied in this statement, but it is never clearly defined. A specific adverse effect should have been stated, such as reproductive impact, and data from the literature reporting on concentrations of the COC in water, sediments, or tissues that result in reproductive impairment in bass should have been used to assess whether conditions at the site pose a risk to this species.

The selection of largemouth bass as representative receptor species was a poor choice in light of the fact that the authors acknowledge that this species most likely does not inhabit the streams being studied. The document did acknowledge that the bass did represent a particular trophic level of aquatic organism. A few passes with a seine through these streams would likely have netted fish that would have provided species more representative of the stream. Similarly, a few benthic samples could also have been collected and the species identified and enumerated to provide some indication of the health of the benthic community. However, neither was done.

Under Section 4, page 4-1, a number of assumptions were listed. One of these stated that a biota-to-soil/sediment accumulation factor of one was assumed for terrestrial and aquatic vegetation, terrestrial and aquatic invertebrates, fish, and small mammals. However, in Table D-5 (Hazard Quotient Calculations for Largemouth Bass), which listed mean and maximum concentrations of COC in sediment and the estimated concentrations of the COC in benthic invertebrates, the concentrations in the invertebrates is one-half that listed in the sediment. If a BSAF of 1 was used, then the concentrations in the invertebrates should have been the same as that in the sediment based on the information given in the document. Because all of the COC were trace elements, TOC and percent lipid would not have influenced the estimate of the concentrations of the COC in the benthic invertebrates. Because benthic invertebrates were assumed to make up 100 percent of the diet of the largemouth bass, the calculated doses and HQs listed in Table D-5 were all one-half of what they should be, based on the above assumption. This should be clarified.

The body weight used for the largemouth bass in calculating dose was 0.6 kg (1.3 pounds). This represents a reasonably large bass that is primarily, if not entirely, piscivorous. The assumption that such a fish is going feed entirely on benthic invertebrates is not realistic. Although an ERA should use conservative assumptions when there is little data, it is also necessary that such assumptions be based on fact. The ERA indicated that the bass was selected to represent an aquatic predator, which implies an organism that is feeding higher in the food web. As stated above, another species of fish should have been selected as a better representative fish species for the streams in question.

No explanation was provided for why or how a dose was used in the largemouth bass. Very few, if any, studies have been conducted that measured the actual dose (i.e., mg food/kg body wt./day) a fish receives, as there are no practical or easy ways to accurately administer chemicals to fish via their food, other than gastric gavage. Generally, studies with fish report exposure as concentration in the ambient water or report tissue concentrations of a chemicals that are associated with some effect. No references were provided for any of the NOAELs or LOAELs used for fish. It is not known where these data were obtained or whether they were reported as doses in the literature. In fact, no references were provided for any of the LOAELs or NOAELs used in the ERA. The authors need to reference all of the data used in the ERA.

The results section (Section 8) on page 8-1 indicated that PAHs and pesticides would continue to be considered as COPC. However, Table 6-1 does not indicate that PAHs or pesticides were considered as COPC after the post-exposure screening. Furthermore, PAHs were listed as being detected in only one sediment sample in Table 8-1 and did not appear to represent a substantial threat to aquatic organisms in the stream. Table D-5, which listed HQs for the largemouth bass, also did not indicate that PAHs or pesticides were considered as contaminants of concern. This is an example of how risk management decisions could influence the results of the ERA.

The BTAG screening guideline listed for arsenic in sediments in Table 2-3 on page 2-20 of the document was 57 µg/kg, however, in the BTAG screening guidelines the list of guidelines indicated that the source of the arsenic guideline was the AET for the amphipod, which is 57 mg/kg. There appears to be an error in the BTAG screening level table. Using a value of 57 mg/kg instead of 57 µg/kg would eliminate arsenic as a contaminant of concern in sediment.

The BTAG guideline for chromium (total) was listed as 5 µg/kg in Table 2-3 of the document. This concentration was listed as the guideline for the protection of aquatic flora in the BTAG guidelines for Region III. A guidelines of 260 mg/kg in sediment was listed for the protection of fauna. Because aquatic plants were not considered as receptor species in the ERA, it seems that the higher concentration of 260 mg/kg should have been used to be consistent with the selection of receptor species. Using this value, chromium would still have been listed as a COPC because its HQ would still have exceeded 1 (292/260 = 1.1), but would have been substantially less than the HQ of 58,400 listed in Table 2-3.

In assessing aluminum as a COPC in soil, the ERA used the BTAG value of 1,000 µg/kg (1 mg/kg) in soil, which is listed as being protective of flora. Again, flora were not considered as receptor species of concern and the BTAG value appears to be overly conservative. According to Shacklette and Boerngen (1984), the average concentration of aluminum in soils of the conterminous U.S. is 47,000 mg/kg, a concentration substantially greater than the BTAG guideline of 1 mg/kg. The maximum concentration of aluminum reported in Site 2 soil was 179,000 mg/kg and the resulting HQ for soil was reported as 179,000. If 47,000 mg/kg were used as the guideline, an HQ of 3.8 would result. It seems doubtful that aluminum presents the potential risk to terrestrial organisms implied by the HQ presented in Table 2-1. The BTAG guideline should be reevaluated and a more realistic guideline be used for aluminum.

Based on the information presented in the draft ERA for Site 2, the risk the site presents to aquatic receptors, including NOAA trust resources, is difficult to determine. Insufficient information was presented describing the streams on the site, the resources that may use them, and to what other water bodies they discharge (i.e., Mason Creek). Additionally, the fact that none of the toxicity information was referenced made it impossible to validate the LOAEL and NOAEL concentrations used in calculating the post-exposure HQs. As stated above, the use of dose (mg/kg/day) in estimating exposure in fish and the assessment of risk to fish communities based on dosage in largemouth bass is also suspect. In its present form, the ERA does not provide sufficient information to allow confidence in its results or conclusions regarding potential risk to aquatic receptors at the site.

The conclusion indicates that sample NBS2-SD02 is from the center of the slag pile. Figures 2-3 and 2-6 do not show this. In fact sample SD02 appears to be a sediment sample location in the drainage way adjacent to the slag pile. There is an SB02 sample location near the center of the slag pile and associated with monitoring well 01. This sample identification needs to be clarified.

References

Lindsay, W.L. 1979. *Chemical Equilibria in Soils*. John Wiley & Sons, N.Y., N.Y. 449 pp.

Shacklette, H.T. and J.G. Boerngen. 1984. Element concentrations in soils and other surface materials of the conterminous United States: an account of the concentrations of 50 chemical elements in samples of soils and other regoliths. U.S. Geological Survey Professional Paper 1270. U.S. Geological Survey, U.S. Government Printing Office, Washington, DC.

If you have any questions, please contact me at (215) 566-3321.

Sincerely,

Peter T. Knight
NOAA - Coastal Resource Coordinator